Advancing Rural Queensland

Standing Committee on Education, Employment, and Workplace Relations:

Inquiry into meeting the education and skills requirements for the agriculture sector in Australia

Submission

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Introduction

AgForce is the peak lobby group representing the majority of beef, sheep & wool, and grain producers in Queensland. AgForce represents around 7,000 members and exists to ensure the long term growth, viability, competitiveness and profitability of these industries. AgForce also operates as a Registered Training Organisation that specifically meets the training needs of broadacre agricultural industry in Queensland, with this role funded largely by accredited fee-for-service activities.

AgForce Queensland welcomes the invitation to make a submission to this inquiry on what is an issue of vital importance to the capacity of Australian agriculture to continue to provide high quality food and fibre products to domestic and overseas consumers. The world's population is forecast to rise to 9 Billion at around 2050, with the concurrent challenges of scarcity in water, productive land, oil, phosphorus and agricultural R&D investment[1], and overlain by climate change effects. Australian agriculture is projected to be one of the most adversely affected from climate change, and potentially faces more extreme impacts than its competitors[2].

To meet the food demands of 9 Billion people, the world's agricultural system must increase food production by about 70% by 2050. As a significant food exporter and source of agricultural production expertise of significant value to developing countries, Australia will play a role in meeting these global challenges. Having an appropriately skilled and educated workforce is integral to the sector's ability to make this contribution, achieve productivity gains and compete effectively in an international marketplace.

Our submission will follow the order of items as specified in the Inquiries' Terms of Reference.

Response to Considerations Raised

The provision and content of higher education and skills training for agriculture, the adequacy of current educational arrangements in meeting the Australia's agricultural labour market needs, and the impact of any supply and demand discrepancies on business, research, and the economy more broadly.

Agriculture in Australia is characterised by[3]:

- Rising total product output levels (doubled since 1974/75)
- Declining number of people employed (9% of employment in 1966/67 to 3% in 2007/08)
- Declining proportion of the national economy (3% of Gross Value Added, down from 4% in the mid-1970s) and relative export volume (24% in 1974/75, declining to 13% in 2007/08, note: this volume was influenced by drought conditions)
- Declining land area used (425M ha in 2006/07, down from 500M ha in 1975/76)

[1] Cribb, 2010

[2] www.climatechange.gov.au/climate-change/impacts/agriculture.aspx, accessed 29 October 2010

[3] Productivity Commission, 2009. Government Drought Support. Inquiry Report No. 46. February 2009.

- Declining terms of trade (this has slowed down in past decade) offset by increases in farm size (average of 3400ha in 2004/05 up from 2500ha in 1968/69), productivity increases and enterprise adjustments (e.g. less wool production)
- Declining number of farm businesses (196,000 in 1968/69 to 130,000 in 2004/05) but a rise in business output (11% with Estimated Value Agricultural Operations of >$500,000 in 2002/03 up from 3% in 1982/83, largest 30% of businesses produce >80% (beef), 70% (sheep) and 62% (grain) of total industry output).

While Australia's agricultural workforce is older and with lower levels of formal qualifications than in other industries, agriculture requires a very diverse primary skill base (i.e. engineering, economics, sciences, mechanics, marketing, transport, property, natural resource management, veterinary, animal welfare, animal nutrition, soil science, hydrology etc). In 2008, the agriculture and fisheries workforce had the highest median age of any workforce in Australia (48 years) with almost 36% of workers aged over 55 years, and only 23.6% aged less than 35 years.[4] The proportion of people with a degree working in agriculture is around 7%, compared to 22% for the general community, with about 1/3rd more operators of the top 30% of farms (on estimated value of production) having a degree qualification compared with the operators of the bottom 50% of producers.[5] Further, those without post-school qualifications comprised a larger proportion of those involved in agriculture (60%) than in the general community (40%). Due to significant ongoing efforts the levels of education within agriculture are increasing but this trend this will continue to need government and industry support to reach the level of the general community.

There is a disconnection between the increasingly complex agricultural systems being managed (larger size, greater per enterprise and industry output, increasing use of technology and less labour) and the uptake of formal education by producers. Although not accounting for recognition of prior learning, there is a positive link between formal post-secondary school education and farmer innovation and production system change, including adoption of new crop cultivars and livestock breeds.[6] It is vital for the effective management of increasingly complex production systems and for achieving the needed productivity increases to renew the push into effective agricultural skills training and higher education investment. This must be integrated with ongoing research, development and extension (RDE) investment to ensure that the technologies and the improved, environmentally-friendly management practices being developed are capable of being taken up by a well-informed and capable agricultural workforce.

Farmers act as stewards for more than 58% of the land mass of Australia (Rangelands Australia) and need support in developing the skills to balance the need for economically viable primary production with achieving environmentally sustainable land management in a complex and heterogeneous landscape. Primary producers also make a valuable contribution to the broader community as the principal custodians of applied agricultural knowledge and systems management experience; a knowledge base that is eroding as older farmers leave the industry.

[4] AgriFood Skills Australia, Environmental scan of the agrifood industries 2010, ASA, Canberra, 2010
[5] Productivity Commission, 2005. Trends in Australian Agriculture, Research Paper, Canberra.
[6] ABARES 2009, Research report 09.16

"As a nation we have grown wealthy on the food and fibre produced by extraordinarily hard working and innovative farmers. We have all shared in that wealth and we expect to continue to benefit from it. Yet it is time to give something back to the landscape and to the people who manage it."

Wentworth Group of Concerned Scientists, *Blueprint for a Living Continent*, 2002.

The adequacy of funding and priority given by governments at the federal, state and territory level to agriculture and agribusiness higher education and vocational education and training

While Australian public investment into agricultural RDE represents about 80% of total agricultural R&D investment and has risen from $131 million in 1952/53 (2006/07 dollars) to around $778 million in 2006/07, average annual growth in public investment has declined during that period and research intensity is down from over 5% in 1977/78 to about 3% of agricultural GDP.[7] Sheng et al. (2011) also reported that the provision of extension services by the public sector has also declined from 24% of total public agricultural RDE investment in 1952/53 to around 19% in 2006/07. Not all of this reduction has been offset by increases in private sector provision, particularly in Queensland which historically has less of a culture of using private consultants and so a lower supply of them than the southern States. This may relate to the relatively greater cost of time and transportation to visit individual clients, an issue that also applies to Western Australia and the Northern Territory.

The impact of this declining investment flows on to reduce the human capital in industry and so the capacity to find productivity improvements. Broadacre total factor productivity growth averaged around 2.2% p.a. before 1983/84 but has dropped to 0.4% p.a. from that time, with evidence that slow growth in public RDE investment from the late 1970s has contributed[8]. ABARE has indicated a decline in productivity of 1.4% p.a. in the decade to 2007[9]. While it should be noted that other factors like drought, farm consolidation and the removal of trade barriers also influence productivity, Sheng et al. (2011) estimated that domestic public RDE knowledge accounted for annual productivity growth in the broadacre industry of 0.60% p.a., about equal to the contribution of foreign R&D knowledge, with both sources accounting for the bulk (total 1.23%) of average annual broadacre productivity growth (1.96% a year).

Productivity growth assists in offsetting the effects of declining terms of trade and maintains the Australian farmer's capacity to compete in a distorted global commodity marketplace. Worryingly it may take up to 30 years for increased public investment into RDE and education and training to flow through to on-ground impacts. Past public investments in broadacre extension have generated average rates of return that could be as high as 47% per annum.[10] While immediate increases in public RDE and education investment are unlikely to improve productivity growth in the short term, good returns on public investment are available and we must not delay in increasing this investment.

Innovative capacity and technology uptake is linked to producer education levels and a greater ability to effectively integrate innovations into farming systems and make better decisions, which

[7] Sheng et al., 2011.
[8] Sheng et al., 2011
[9] Mullen, 2010
[10] Sheng et al., 2011.

lead to higher productivity[11]. A university, TAFE or high school education increases the probability of a grain-grower being a 'high innovator' (28%, 20% and 16% increase respectively) when compared to only having a primary school education, with university educated growers exhibiting average productivity 37% higher through researching and applying new information.[12]

These findings support the '*need for a greater emphasis on education, skills and training in the agriculture sector along with improved information accessibility through efficient public and private extension. Human capital is likely to become even more relevant to maintaining and improving grower productivity given a tightening labour market, increasingly sophisticated farm technologies and the growing importance of integrated farm management practices*.'[13]

Nationally, over a three year period, the number of advertised jobs in agriculture in newspapers and on the internet were more than 50,000 for production (on-farm) and agribusiness jobs, showing that there were around 15,000 jobs per year; about 9000 for production and 6000 for agribusiness.[14] Australian agriculture faces a labour shortage of at least 96,000 full-time workers and 10,000 part-time workers with a critical issue facing Queensland primary industries being the attraction, development and retention of a skilled workforce[15]. About 4 % (85,000) of Queensland's workforce are employed in the agriculture, forestry and fishing industries, and about 33,000 in the grain, sheep and beef cattle sector, with employment demand in sheep, beef cattle and grain farming sectors expected to increase by 20,600 over the next five years[16]. Skilled agri-food sector labour shortages may be experienced as soon as between 2013 and 2018, due to the interaction between the age crisis within agricultural labour and the resource industry's rising labour demand.[17] The competition from the resource sector is compounded by state government funding support that is specific for that sector. The Queensland Government has established a $50M strategic investment fund. Of the $30M invested so far greater than $8M has gone to resource sector programs, and there doesn't appear to be an agriculture-specific component included. Further Skills Queensland has been investing in a "Work for QLD" campaign which includes TV advertisements, billboards and several career expos around the state aimed at the resource sector but this kind of Government support does not appear to exist for other industries. Anecdotal evidence suggests that a skilled labour shortage already exists within broadacre agriculture.

Given these shortages it is evident that there is a market failure in producing sufficient skilled workers to meet the needs of Australian agriculture, suggesting that the current level of funding is inadequate and needs to be increased, either with new funds or a refocusing of existing expenditure.

School-based training

Vocational Education and Training (VET) in Schools accounts for 10% of all agri-food students nationally with 8,933 students (> 4,000 in rural production) enrolled in a nationally-endorsed

[11] Nossal and Lim, 2011 ABARES research report 11.06.
[12] Nossal and Lim, 2011
[13] Nossal and Lim, 2011
[14] ACDA, 2009.
[15] QDEEDI, 2010.
[16] QDEEDI, 2010.
[17] Agrifood Skills Australia, 2011.

qualification in 2009.[18] In our state, the Queensland Government and Skills Queensland provide funding for the Gateway Schools to Agribusiness program ($150,000 per annum covering 16 schools, with funding from Agrifood Skills Australia), and a School to Industry program ($120,000 per annum) that operates in partnership with AgForce Queensland (our in-kind contribution is valued at around $60,000). At the start of the 2010/11 financial year, there were 861 students undertaking traineeships in agriculture, down 10% from 2008, with funding by the Department of Education and Training for agriculture and animal studies close to $2M in 2009/10.[19] Despite this, a significant number of students did not complete their training.

Some issues identified with agricultural School-based Apprenticeship or Traineeship (SAT) include:

- inflexibility of programs
- lack of involvement by employers and interest by students or teachers
- effort of travel to properties (especially for urban students)
- variation between schools in available programs (ameliorated to some extent by the requirement to conduct industry validation of VET programs)
- more strategically, the unattractive image of jobs in primary industries and lack of visible and promoted career paths.

As promoted by the Primary Industries Education Foundation, agriculture should be introduced into the wider primary and high school curricula and into schools other than 'Gateway' schools so that children are made more aware of agriculture and agricultural careers. This is particularly important given the highly urbanized nature of Australian society and its increasing disconnection with agriculture.

Vocational Education and Training (VET)

VET training for Queensland primary industries is funded through:

- VET Revenue General for TAFE Queensland and the Australian Agricultural College Corporation (AACC) programs ($12.97M for agriculture in 2009/10)
- Training for apprentices and trainees by public and private RTOs ($4.34M)
- Strategic Purchasing Program in cases of market failure ($1M)
- Productivity Places Program (PPP) funded by the Commonwealth and Queensland Governments and industry fee for service ($2.7M)[20].

Given the shortfall in the agricultural workforce, it is concerning that it appears that agriculture is not currently identified within the highest priority grouping for VET funding. Within the system funding priority is given to TAFE and agricultural colleges and Universities. This prioritisation process impacts on private and industry-related Registered Training Organisations (RTO) who then struggle to access the required funding to meet the direct demands of industry. There is a lack of direct-demand funding pools open to industry groups to provide VET training, resulting in a lack of funding for industry-identified, priority basic skills development, and this issue should be addressed when funding is being allocated. For example this includes areas such as workplace health and safety,

[18] Agrifood Skills Australia, 2011.
[19] QDEEDI, 2010.
[20] QDEEDI, 2010

machinery operation, livestock handling, chemical safety & use, chainsaw operation, welding and fencing etc. Current government priorities lag a number of years behind the needs of producers and given the delay of 12 to 18 months for an RTO to deliver funded training on-ground, industry participants seeking training have often 'made-do' with temporary solutions which leaves the underlying skills deficits still in place. For example the current FarmReady funding of climate change training is 5 years behind the demands of those farmers seeking proactive solutions. Providing industry RTOs with direct funding will assist in reducing the lag between VET demand and supply.

Quantitative and comprehensive data on the existing workforce needs of the agribusiness sectors is scarce with adequate funding required to gather better data on current and future workforce demographic and occupational skills profiles at a regional and an industry level.[21] AgForce is currently undertaking a survey of the broadacre agricultural industry in Queensland to try to obtain some of this data.

Higher education

In addition to the described workforce shortfalls, the Australian Council of Deans of Agriculture (ACDA) has undertaken several studies and concluded that the number of agricultural higher degree graduates produced nationally falls as much as 6 times short of levels needed (about 5,000 graduates needed per year with a supply of < 800 graduates per year from Australian universities). This is a result of limited numbers of school-leavers enrolling in agriculture courses. More funding is required to engage with students around agriculture while they are still at school. This could include 'agricultural experiences' for early secondary school students. Data from an AgForce/UQ collaborative survey is presented below which further highlights this point.

There are also too few agriculture graduates going on to research higher degrees, likely due to low and unattractive postgraduate stipends compared to the initial salaries offered to new graduates. Increased funding for Australian Postgraduate Awards (APA) scholarships for areas of identified skills shortages where limited industry-funded scholarships exist, such as in agriculture, may help to address this shortfall.

When considering agricultural education funding, in addition to the magnitude of total investment, the balance between achieving shorter- and longer-term industry outcomes must be considered. One size does not fit all and an appropriate balance between research (blue sky and applied) at one end and extension (dissemination and methodological research) through to skills development and higher education at the other, must be achieved.

Conclusion

It is our contention that funding levels are inadequate and/or poorly targeted as evidenced by the ongoing shortfall in meeting industry needs, in terms of numbers and skills levels of agricultural employees.

The reasons and impacts of the decline in agricultural and related educational facilities

[21] Agrifood Skills Australia, 2011.

The reasons for the decline in agricultural education and skills development and facilities are multiple, complex and include:

- Real reductions in public funding intensity since the 1980s producing a greater reliance on the competitive grants system by education providers
- Rural Development Corporations being slow to put funding into overcoming the human capacity constraints in RDE that have resulted from reduced public funding
- A multitude of agricultural education providers nationally (large and regional universities and similarly of TAFE and other colleges) leading to unproductive competition and fragmentation of student numbers, staff and funding and stifling the emergence of centres of excellence in agricultural education and improved educational outcomes[22]
- Less contact of the urban population with farms and farmers over time due to a declining rural workforce
- Declining capacity of the rural and remote population to influence the political agenda
- Competition with resource extraction industries in northern Australia for both skilled and unskilled labour, including Environmental Management and Environmental Science students, flowing on to impact agricultural enrolments and hence expenditure on agricultural facilities
- Cost impediments for education providers running agricultural courses in terms of purchase and maintenance costs of livestock, machinery and arable land, OH&S, welfare processes etc leading to more theoretically-based courses that are less able to produce 'work-ready' graduates
- High student contribution levels (HECS), negative perceptions about the benefits of working within agriculture and a lack of clear career pathways in agriculture may discourage enrollments and in turn the capacity to fund facilities.

Impacts

VET

As mentioned above AgForce is undertaking a survey of skills and labour needs of landholders including a question: "what do you perceive as the greatest impediment when recruiting/employing staff?' While not yet completed, preliminary results are that 55% of respondents indicated a lack of skilled staff, 32% indicating cost of employing and/or competition from the resource sector and 13% cited other impediments.

Given the increasingly complex local and international marketplace, increasing regulatory burdens and continual development of technologies the capacity of producers and new farm workers to learn on the job is limited and so training programs need to improve so that workers are job-ready before they start. Training needs to provide trainees with the skills that industry prefers employees to have prior to employment such that they can work largely without supervision, as well as those skills that help to increase the profitability and sustainability of an enterprise. This outcome will require higher priority and improved funding levels to achieve in comparison to the current system.

[22] NRAVS submission to the Parliament of Australia, House of Representatives, 2007

'Producers spend half their time trying to catch up on and learn all this new technology. The trouble is that we are not getting it through vocational training; we are getting it through getting out there and struggling and learning ourselves. The education network is just not working for us'.[23]

It is vital that VET training facilities are up to date and relevant to modern agriculture. VET training providers must run practical courses under real working conditions with up-to-date trainers that understand current commercial realities, including the use of the latest equipment. The TAFE training system (classroom based with little practical application) is not ideal for developing practical skills and lacks the flexibility of a workplace-based delivery approach. Delivery of these programs needs to be more flexible as the traditional TAFE based apprenticeships are less effective in an agriculture setting because the work place is often located hundreds of kilometers from the nearest College. Further, any remote course delivery (distance education model) must account for variable internet access speeds in remote areas of Queensland. For example, it is our understanding that the proposed National Broadband Network (NBN) will deliver a speed of 100Mbps for optical cable customers, but only 12 Mbps for Satellite customers in more remote locations.

Higher education

Over recent years there has been a steady decline in the number of graduate completions in agriculture for universities in Australia and in the number of students applying for places within agriculturally-specified courses.[24] Declining public agricultural investment is leading to closer cooperation between Universities, relevant State Departments and CSIRO in the provision of research and research training in agriculture. This has extended to some co-investment in research and educational facilities. For example, the Queensland Alliance for Agriculture and Food innovation (QAAFI), formed in 2010, has seen State Department agricultural researchers placed into a University of Queensland Institute structure. Since establishment, these Departmental scientists have already played a role in providing training and skills development opportunities for University interns and higher degree students and provide lectures into undergraduate courses.

This cooperative model has much to commend it including economies of scale, access to cutting edge expertise and developments, rich multi-disciplinary learning environments and improved communication between the higher education sector and the state government. AgForce has made preliminary steps to engage more closely with QAAFI to ensure clear relevance to industry of outputs from the Alliance. There is a need for greater connection between industry, science, educational institutions (primary school to university) and government regarding the provision of agricultural educational facilities.

Solutions to address the widening gap between skilled agricultural labour supply and demand

Higher education

A key part of the problem in ensuring the human capacity needs of agriculture are met is in recruiting sufficient younger people into a career in agriculture. Published Australian-relevant data

[23] Mr Michael McCosker, in House of Representatives review 2007 page 105
[24] ACDA, 2009

on this problem has been limited so AgForce and The University of Queensland undertook a survey of agriculturally- and non-agriculturally focussed, first year science students in 2011 to improve our understanding of career aspirations and attitudes towards agricultural careers. In the survey agriculture was defined as '*the production, processing, and distribution of food and fibre products'*. The survey report is attached as Appendix 1 to this submission. From the survey data a number of useful indications emerged on how to effectively engage with students on this issue.

Of the 486 students who completed surveys, 74 indicated that they were doing agriculturally-related programs. Agriculturally-related programs could be characterised as:

- Having a greater proportion of males (41%) than Non-agriculture (27%) programs
- Having a lower proportion of School Leavers (40.5 vs. 56.9%), possibly related to deferment of studies to qualify as being independent so as to receive greater Government support[25]
- Having a greater proportion of students from a farm or rural property background (49% vs. 15%)
- Having a lesser proportion of students satisfied with available information on their career of interest (75 vs. 85%)
- Seeing working outdoors or with plants as more important characteristics to career selection.

Other key findings included:

- prior experience of agriculture increases a student's interest in agriculture-related areas (including farming, production animals, plants and agribusiness)
- the cross-over between thinking about and making a career decision appears to coincide with the middle of secondary school
- workers in a field are second only to parents in influencing career decisions of students, with 5 times as many students reporting the influence of workers than career advisors or industry representatives
- respondent's perception of agricultural work was traditional, namely; based outdoors, involving working with animals or plants, not interesting, don't need to be well-educated
- career expectations of first year students were not very clearly defined, suggesting a need to provide more detailed information to students as to what working conditions, experiences and skills are involved, identification of professions currently short of people, and training and career pathways
- Answers (n = 417) indicating what would motivate more young people to take up a career included provision of more information:
  - promoting general awareness of agriculture (30% of respondents)
  - the diversity and opportunities existing within agriculture (17%)
  - on agricultural jobs including availability (14%)
  - highlighting earning opportunities (14%)
  - on the importance of agricultural jobs and careers (11%)

[25] Godden, 2007

- making agriculture more 'interesting' or less 'boring' (10%)
- at an early stage when students are younger or still at school (10%).

Some solutions to matching agricultural labour supply to demand that emerged from this and other studies included:

1. Re-examination of the eligibility rules for accessing Government study support, removing barriers to rural and regional student enrolment, and negotiating lower education contributions (HECS) for agriculture would increase the number of students doing an agriculture degree
2. More flexible external agricultural course offerings and agricultural work experience opportunities might appeal to a greater number of mature age students
3. Providing urban students (>75% of group, in line with other studies[26]) with prior exposure to agriculture, and exposing other enrolled animal students to livestock in their courses
4. Educating urban students about the range of urban-based agricultural jobs or the lifestyle benefits of rural living
5. Increased incentives for students to enrol into plant, food and soil sciences[27]
6. Increased and detailed information on the range and diversity of interesting agricultural careers and pathways into them should be provided to mid-secondary school students, including via one-stop-shop career websites such as the Career Harvest website (http://www.csu.edu.au/special/acda/careers/)
7. Delivering more active engagement processes for younger male students, such as computer-based learning games or hands-on practical experience programs
8. Greater support or resourcing of workers in the field to enable them to communicate information on jobs/training and their passion for a field, and provide work experience opportunities
9. Promoting the excellent levels of satisfaction reported by university agriculture students, derived from a combination of good learning support, challenge and active participation[28]
10. Promoting the good employment outcomes (about 90% in full-time employment related to their long-term career goals within 3 years) and job security enjoyed by agriculture graduates[29]
11. Promoting the earning potential for bachelor graduates (agriculture and environmental science graduate median full-time salaries of $58,000 in 2009, $84K for post-graduates)[30]
12. Recruiting a wide range of industry and education stakeholders to engage with potential students and the media to present agriculture as a profession to society in a way that more closely reflects the technology-based, efficient and sustainable production systems existing, and the important contribution agriculture makes to addressing issues like food security, animal welfare, climate change and environmental stewardship.[31]

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[26] Hynd and Hazel, 2010
[27] Hynd and Hazel, 2010
[28] ACER, 2008; 2010a
[29] Carroll, 2010. Beyond Graduation 2009. The report of the beyond graduation survey. Graduate Careers Australia Pty Ltd, Melbourne, Victoria
[30] Carroll, 2010; Agriculture and Food Policy Reference Group, 2006
[31] Agriculture and Food Policy Reference Group, 2006

The range of factors highlighted by respondents as messages to encourage more young people into agriculture suggests no one single message will be effective in addressing this issue, but that general awareness programs are vital and that these need to reach students thinking about careers in early secondary school. Involving passionate champions, including recent agricultural graduates, is likely to more effectively inspire prospective students.

Effectively educating and inspiring urban students (particularly in early secondary school), and their career influencers, about modern agriculture will require building a coalition of stake-holders willing to share the costs of delivering such a program; from farmer organisations, agribusiness, and education providers through to government. A supportive coalition would be able to more widely spread the cost of skilling workers such that they are in a position to be paid more competitive wages. It would also provide access to higher degree scholarships above the poverty line, and clear career development pathways, including cadetships/traineeships and awards, longer employment contracts and mentorship by current and retired workers, that would result in improved retention of existing workers.

There is great potential for establishing clearer pathways from School-based programs, through VET to higher education courses, although problems exist around identifying skills and competencies achieved during VET programs to meet university requirements for crediting such skills.[32] Some rationalisation of competency standards may be required before this streamlining of progression can become a reality.

Vocational education and training

1. Recognition of prior learning

Farmers in modern agriculture are generally good environmental stewards and capable business managers providing food, fibre and environmental services in a sustainable manner. They often don't realise the amount and range of knowledge and skills that they possess. It is essential that there is recognition for prior learning (RPL) of primary producers to enable community recognition and respect for the extensive skill sets held by primary producers and farm workers operating in modern agriculture. AgForce members feel that when negotiating with government, on such issues as land management, it is important to have a formal qualification to demonstrate a level of skill and understanding of issues. Barriers to seeking RPL include a lack of awareness of the process, the complexity of the process, exclusive language around recognition, devaluation of past experiential learning and a preference for active participation in training.[33] Despite these obstacles there is significant potential to promote and use RPL to formally recognise the skills of producers and their staff. This recognition could be applied across the education spectrum including higher education, as has been demonstrated successfully by Rangelands Australia.

2. Supply industry-ready trainees

'The industry needs people ready to be employed—useful young people who can actually go onto the farm, start working and be a useful component of the farm. Farmers do not have the time to be

[32] Agrifood Skills Australia, 2011
[33] Agrifood Skills Australia, 2011

doing all the training on their farm. They are busy keeping their enterprises going and dealing with a whole range of other things, such as the drought. I think having the young people industry-ready will make a big difference'. Wendy Allen, AgForce training manager.[34]

The VET educational institutions, particularly the Agricultural Colleges, have not been focussing lecturing on the subjects and developing the skills needed in the field by industry, and so have problems with low completion rates of training packages (if not units of competency).[35] To address this issue, in Queensland on 1 July 2008 the Australian Agricultural College Corporation (AACC) moved into the Department of Employment, Economic Development and Innovation (DEEDI), to ensure closer links to DEEDI´s research and extension services, as well as the Gateway Schools for Agribusiness project, TAFE, and the university sector. AACC is also intending to increase the number of training locations, the diversity of training products and modes of delivery to better respond to industry demand. In 2010/11 there were over 5,400 students enrolled at the AACC, the majority being short course enrolments.

AgForce and DEEDI have identified that trainees entering the broadacre industries need to have skills in stock handling, mechanical work and problem solving and further training in chemical accreditation, computer property mapping, vegetation management, welding, chainsaw use and maintenance, rural safety (both employee and employer requirements), succession planning and business development.[36] It is important that VET providers like AACC are more flexible in delivering targeted programs and negotiate with industry to identify what training is needed.[37] Trainers must be highly skilled, current, competent and capable of communicating clearly as outlined in the Australian Quality Training Framework conditions and standards of registration.

3. Effective consultation with industry

A key element is the development of effective consultation, closer co-operation and strong partnerships between government, industry and training providers to better match the training that is in demand by industry and that being supplied.[38] This could include workforce data collection and needs analysis for specific sectors, such as cropping.

4. Delivery of industry-relevant training

AgForce has surveyed a cross-section of members to gauge industry skills and training needs[39] and found that:

- 70% of respondents indicated they expected their demand for staff will increase within the next five years, depending on good seasons, commodity prices and finances
- Only 10% of respondents have employed a trainee, as a result of lack of familiarity with the process of accepting one, prohibitive cost and lack of time for supporting trainee learning.

[34] House of Representatives Inquiry report, 2007. p117.
[35] Agrifood Skills Australia, 2011, P25
[36] QDEEDI, 2010
[37] Agriculture and Food Policy Reference Group, 2006
[38] Agriculture and Food Policy Reference Group, 2006
[39] QDEEDI, 2010.

Traineeships are seen to require much employer effort with potentially little long-term reward

- 30% of respondents spend money on their own training each year and employers spent ≤ $500 annually on their training and the same for their employees
- Members base their assessment of new employees on displayed skills (keenness, initiative, willingness to learn, stock handling, mechanical, problem solving) with 80% preferring to employ someone with the capacity to work without supervision
- It is becoming harder to employ people who want to build a career in agriculture.

Training requirements will vary with individuals but there are skills in demand across all sectors of Queensland agriculture which include[40]:

- Marketing - customer relationships, calculating cost of production, identifying/maintaining competitive advantage, establishing partnerships, business promotion, market expansion
- Finance - understanding financial statements, undertaking a sensitivity analysis, developing/implementing risk management strategies including forward pricing, preparing a cash flow forecast
- People management - building effective communication, providing feedback to employees, building team spirit and motivating people, dealing with conflict and change
- Information technology – general computer skills, property computer mapping and GPS use
- Business planning - identifying future opportunities and threats, accessing government information and programs, writing applications, managing time, preparing the business for sale or succession, understanding legal responsibilities
- Workplace health and safety and compliance issues - risk assessment in order to maintain standards, quality assurance, animal welfare, OHS, first aid, calculating dose rates
- Sustainability, climate change and environmental management - carbon trading, energy use and management, grazing management, soil carbon and fertility management, biodiversity management, property management systems.

Industry-specific skills in demand[41] for the Queensland beef industry include cattle nutrition and reproductive husbandry, pasture and water management, low-stress handling of cattle, animal welfare codes of practice, pest and disease identification and management, operation and maintenance of heavy machinery. For the Queensland cropping industry identified skills included agronomy, plant nutrition, soil health and nutrition, weed identification/management, integrated pest management, and general farm maintenance such as fencing, welding and machinery maintenance.

Investment needs to be aimed at improving the producer's skills base, so that they are more capable of adopting developed technology and innovation and include 'soft' skills, like communication techniques, that encourage attraction and retention of staff.[42] Investment in initiatives that increase the rural sector's utilization of technical knowledge to develop competitiveness, productivity,

[40] QDEEDI, 2009. Queensland rural skills and training demand report. The State of Queensland, Department of Employment, Economic Development and Innovation, September 2009.
[41] QDEEDI, 2009, 2010
[42] Agriculture and Food Policy Reference Group, 2006

adaptability and sustainability is particularly supported by AgForce, with adoption by primary producers as a key 'rate-limiting step' in current agricultural innovation. The longer term transformation of the rural sector will likely see increasing pressure for enterprise aggregation and further such corporatization of agriculture. This in turn will require a greater degree of managerial effectiveness, skills training and personal development in producers to handle farming operations both greater in scale, complexity and competing priorities.

5. Flexible delivery

It is important for governments, providers and industry to minimise the barriers to the uptake of training opportunities.[43] The main barriers to training are distance, the time required to attend and the cost of training, a particular consideration for those non-permanent employees. It is more difficult for producers to attend training where delivery is confined to larger centres, thus requiring significant travel, and where it is offered during periods of other significant and time-defined enterprise activity e.g. weaning or harvesting. So delivery of training must be flexible and appropriately account for these issues.

Alternative delivery methodologies are vital to effectively reach rural and remote primary producers with agricultural skills development opportunities. Where local training cannot be delivered then remote or online delivery of short courses may well be suitable and appropriate funding and resourcing should be made available to identify and deliver appropriate alternative methods. An AgForce member survey has identified a requirement for online learning resources, including OHS/staff inductions, industrial relations requirements, basic computer skills, financial book-keeping, using animal identification in farm management operations, etc. The NBN may well provide new opportunities for online training provision. Preferred more traditional learning methods[44] were attending an industry conference, face-to-face in a small group with a facilitator, informal meetings and discussions with other farmers, and on-the-job training from a work colleague.

6. Adequate government funding

All vocational education and training provided by registered providers should have government funding support, such as being eligible for HECS, particularly as this type of support promotes a culture of self-reliance and continual improvement to a greater extent than other types of government subsidy. [45] The FarmBis program provided training that assisted producers with gaining relevant information and skills to achieve timely and locally-adapted responses to important production and profitability issues[46]. The FarmBis and FarmReady funding models are well accepted in industry but there are some identified issues with the programs. The current 'single-issue' funding restrictions (e.g. only available for climate-change-related training) exclude many producers from accessing training when their need for skilling falls into other areas outside the current identified priority area, but that are vital for achieving sustainable and profitable agricultural practices. The restriction within FarmBis to Certificate IV level or above training programs enhanced the skills of

[43] Agriculture and Food Policy Reference Group, 2006
[44] QDEEDI, 2009
[45] Agriculture and Food Policy Reference Group, 2006
[46] Parliament of Australia, House of Representatives, 2007

owners/managers but restricted the skills and knowledge-building opportunities for important lower-level entry or technical skills. The FarmReady guidelines suffer from these same issues.

Given fluctuations in availability and scheduling of training programs and their availability, particularly in the more remote areas, it would be more effective to place limits on access to funding across a longer period. For example this could involve moving away from a 12 month funding period to a rolling 3 to 5 year cycle. This would add flexibility for producers when scheduling training such that they could access a greater number of courses in a single year while they are locally available and then fewer the following year. Funding models needs to be flexible to meet producer's needs.

7. Clear training and career pathways established

As for higher education, it is important to promote clear career pathways within agriculture (e.g. landholder, grain trading, rural banking, big agricultural companies, private consultancies in grain, cattle, sheep, soils, water, technology etc) and provide a range of formal qualifications relevant to the modern agricultural environment to increase the number of new entrants. Short courses should be accredited so that attendees receive a statement of attainment. With recognition of skills that can be applied across sectors (and indeed industries), there is an increased opportunity for enabling workers to migrate across industries to provide capacity during busy periods.

8. Improved marketing and communication

Establishing a culture of continuous improvement and learning within agriculture is an important step in establishing a self-sustaining learning environment within industry that is independent of government supports.[47] To achieve this marketing of training needs to improve. A communications strategy should be developed and implemented to raise awareness, sell the benefits of training and encourage producers and their staff to participate in accredited training. The cropping industry has a culture of skills development and training through the industry-led Best Management Practices Program and consideration should be given to providing recognition for producers that attend relevant conferences that increase the uptake and adoption of new technologies and ideas.

The impacts of any shortage on agricultural research

As we outlined earlier in this submission there has been declining public investment intensity into agricultural RDE in the past and this sends a strongly symbolic and far-reaching message to young people considering agriculture as a career choice that it is of decreasing value to society and presents increasingly limited career opportunities. A society's capacity to increase productivity is directly linked to the education of its members; the ongoing recruitment of the brightest minds into agriculture is central to Australia's ability to meet the emerging challenges of climate change, population growth and environmental sustainability[48].

The prolonged decline in agricultural enrolments in higher education will mean that the current skills and expertise shortages are likely to persist as a significant constraint to agricultural productivity improvement. Given the long lags between investment and the peak of lifetime productivity of

[47] Agriculture and Food Policy Reference Group, 2006

[48] Alston et al., 2009

agricultural researchers (at bachelor, masters and PhD levels) there are significant lead times required to overcome this constraint. There are expectations that over 50% of agricultural scientists will retire in the short term[49] and there is a large shortfall in younger scientists available to replace them. We reported previously that the proportion of people working in agriculture with a degree was 7%, compared to 22% for the community as a whole and the number of graduates in agriculture is as much as 6-fold lower than needed[50], although some cross-disciplinary transfer of graduates will also occur, e.g. from veterinary to animal production fields. Given the figures reported above there is already a market failure to supply sufficient human capacity in agriculture, despite the current levels of public RDE funding.

The lack of high-quality, research higher degree students in agriculture reflects that such students are not being drawn into agriculture in the first place. This is compounded by a lack of student stipends competitive with salaries in industry and other sectors of the economy[51], and possibly the perception that the salaries of RHD graduates do not fully compensate for the additional time spent studying. Postgraduate scholarship stipends hover around the poverty line, have not retained parity with average weekly earnings in the community and are almost totally unattractive compared to other employment options. This is compounded by a lack of certainty in relation to longer-term operational funding and the availability of permanent positions; both of which are driven by the short cycles of competitive project funding. Relying on market forces to increase the number of scientists in agriculture is likely to be ineffective, given the long lag times between scientist training and subsequent R&D adoption.

There is a requirement for long term investment in human capital within agriculture with the potential for significant and ongoing market failure or inefficiency without appropriate government co-investment. Individual primary producers or industries have limited private financial interest in paying for the maintenance of human capacity in rural R&D. Further withdrawal of Australian and State Government funding will put further pressure on research providers, such as the CSIRO and universities, to bear a larger proportion of the cost of maintaining R&D human capital and the associated infrastructure. It is essential in meeting R&D skills demands that faculties delivering agricultural courses are well-equipped and resourced at both undergraduate and post-graduate levels. This may require greater collaboration with state government agricultural departments and other higher education providers to spread the overhead and administrative costs.

The Rural Development Corporations have programs aimed at improving human capability at both applied and scientific levels. For example, the Grains Research and Development Corporation (GRDC) funds technical workshops, 'train the trainer' courses and industry leadership development, sponsors The Australian Rural Leadership Program, and The Science and Innovation Awards for Young People in Agriculture. GRDC estimates the benefit: cost ratio over 30 years for these investments in capacity building to be 4.2:1. There are also RDC programs focused on building strategic R&D capacity. For example GRDC provides PhD scholarships, funding of strategic Professorial positions, conference sponsorships, and expertise development in areas of potential future skills shortage. Meat and Livestock Australia has development programs for early-career

[49] PMSEIC, 2010
[50] ACDA, 2009
[51] ACDA, 2009

animal scientists that fund skills development and Professorial positions. Research providers such as Universities commonly use RDC-funded projects to train younger researchers in a wide range of scientific skills. In funding these projects the RDCs have recognised the value of R&D skills development as a collateral outcome. Government co-contributions to RDCs should be maintained and preferably increased to meet this human capacity requirement.

Australia can 'adapt' overseas R&D to local conditions while we maintain an appropriate capacity to understand, adapt and apply the imported research. Australian agriculture cannot rely too heavily on importing overseas R&D without concurrently building the domestic scientific and practical capacity to effectively implement it. In addition to adapting R&D, Australian scientists provide world-leading basic research with the resulting profile used to produce value-adding international collaborations. This is a key part of the mechanism by which R&D knowledge exchange becomes possible, particularly given the relatively small size of the Australian market.

Development of human capacity has large spillover benefits to rural and regional communities and overseas aid recipients. An IMF study[52] on technology diffusion and multi-factor productivity in OECD countries from 1980 to 2003 suggested that *'domestic R&D may enhance technological transfer, by increasing domestic absorptive capacity, thus allowing countries to import and adapt to foreign innovations faster.'* The report also indicated that improved (or high skill) human capital created externalities both at industry and economy-wide levels that were economically significant: an increase in the share of high-skill workers leads to an increase in industry multifactor productivity growth by 0.5% per annum. One in eight Queenslanders are employed in agricultural jobs and for rural communities productive agriculture means more employment opportunities, new industries, potential population growth and a greater chance of continued service provision.

Australia plays a significant role in encouraging food security within our region including the spillover of knowledge from R&D[53]. Growth in agriculture is up to 4 times more effective in reducing poverty in most developing countries than growth in other economic sectors[54]. The Australian Centre for International Agricultural Research (ACIAR) draws heavily on Australian researchers to provide the necessary experience and expertise to undertake overseas aid work. This expertise is often initially developed through researcher involvement in industry-supported research projects within Australia.

In summary, it is important that agricultural education is sufficiently well funded to:

1. Overcome the coming shortfall in trained agricultural researchers, particularly given long lag times and the emerging slowdown in total factor productivity improvement
2. Provide competitive stipends and sufficient security of funding to encourage the entry of younger scientists
3. Continue to adapt overseas research and gain access to new findings through mutually productive international collaborations
4. Provide spill-over benefits to rural communities around technology transfer and productivity gains

[52] Tressel, 2008
[53] Alston et al., 2009
[54] World Bank, 2008

5. Contribute to regional food security and our international aid obligations.

The economic impacts of labour shortages on Australia's export oriented agricultural industries

AgForce does not have any data on the effect of labour shortages on Queensland's export oriented broadacre agricultural industries. As Australia currently exports about 60% of produced food commodities it is heavily exposed to international trade fluctuations and needs significant education investment to achieve strong productivity gains to remain competitive and continue to deliver safe, affordable and high quality food for our domestic market.

It is worth noting that figures from the OECD[55] indicate that Australia provides its farmers with the second lowest levels of government support, with the US, EU and Canada providing more than double the relative level of support. Further, Australia also has very low barriers to international agricultural and food trade, namely a 0 to 5% import tariff range and a tariff impact on these imports equal to 1.2%[56]. Australian farmers operate in an uneven international marketplace so any reduction in productivity has an immediate impact on our capacity to compete effectively. Public RDE funding through the co-contribution scheme forms the vast majority of Australian producer supports and as we have indicated previously helps maintain human innovative capacity within agriculture.

The 2008/09 Agricultural Survey revealed that the number of businesses undertaking agricultural activity in Australia had fallen to a total of 136,000 businesses, down from 146,400 in 1999/2000.[57] Average Australian beef farm cash incomes and business profit has remained fairly constant around the breakeven point from 1977/78 to 2008/09, although the top 25% of producers have shown a trend towards improved profitability[58]. These facts reflect a long-term trend of industry rationalization and including labour efficiency, which has underpinned some of the productivity gains achieved. While these labour efficiencies and the use of contract labour can continue to be achieved some of the economic impacts of labour shortages in export industries may be mitigated but there is a limit to the extent additional capitalization can offset labour costs. A strong agricultural education sector is vital to maintain the production of high quality food and fibre for domestic and overseas consumption.

The incorporation of animal welfare principles in agriculture education

AgForce is strongly supportive of animal management practices conducive to maximizing livestock welfare outcomes. Animal welfare principles are already deeply embedded in agricultural practice and education within Australia, and industry-supported research continues into further improving livestock welfare. Given the importance of maximizing ongoing market access and maintaining the so-called 'community license to farm', scientifically-validated animal welfare principles should be incorporated into a balanced agricultural education curriculum that also includes productivity,

[55] OECD, 2010
[56] Brown et al., 2008
[57] ABS, 2001; 2010
[58] http://www.abareconomics.com/AME/mla/mla.asp, accessed 13/10/2010

profitability and environmental sustainability. There is no place for philosophically-driven, subjective animal liberation agendas to be imposed in publically-supported agricultural curricula.

Other related matters.

AgForce does not wish to raise any other matters at this time.

Conclusion

As significant land managers farmers need support in developing the skills required to balance the need for economically-viable primary production with achieving environmentally sustainable land management, and within increasingly complex agricultural production systems. Innovative capacity and technology uptake is linked to producer education levels but stagnant RDE investment and a move by public providers out of the extension sphere has seen a decline in broadacre productivity. Further Australian agriculture faces an overall labour shortage, and specific shortfalls in degree qualified and higher research workers. This points to a market failure in producing sufficient skilled workers to meet the needs of Australian agriculture, suggesting that the current level of funding is either inadequate, or poorly targeted, and in need of review.

A key part of the problem in ensuring the human capacity needs of agriculture are met is in recruiting sufficient younger people into a career in agriculture. Our data suggests that no one single message will be effective in addressing this issue, but that general agricultural awareness programs across the primary and secondary school curriculum are vital. Effectively educating and inspiring urban students, particularly those in early secondary school, and their career influencers about modern agriculture and providing 'ag experiences', plus clear training and career pathways will require building a coalition of stake-holders willing to share the costs of delivering such a program; from farmer organisations, agribusiness, and education providers through to all levels of government. It is important that barriers to agricultural enrolments by school students are removed or minimised, such as restrictive eligibility rules for Government study support, the high cost of rural and regional students to attend programs, and the HECS contributions for agriculture.

The key elements relevant to achieving improved VET outcomes are the supply of industry-ready trainees, effective consultation with industry and delivery of industry-relevant training, flexible delivery mechanisms, adequate government support and funding, establishment of clear training and career pathways, and improved marketing and communication. Providing industry RTOs with direct funding will assist in reducing the lag between VET demand and supply.

It is essential that there is appropriate recognition for prior learning of primary producers that can be applied across the education spectrum to enable community recognition, encourage interest in agricultural careers and to develop a culture of continuous learning within industry. Training delivery also needs to be tailored to the skills needs and business requirements of producers, with flexibility in funding programs, including longer-term windows for funding eligibility.

Relying on market forces to increase the number of scientists in agriculture is likely to be ineffective, and so there is a requirement for long term public investment in human capital within agriculture, which has the potential for large spillover benefits to rural and regional communities and overseas

aid recipients. This includes providing competitive stipends and sufficient security of funding to encourage the entry of younger scientists and provide formal career progression pathways.

Given the range of human capacity challenges facing agriculture there is also a need for greater communication and collaboration between industry, educational institutions (primary school to university) and government regarding the funding and provision of agricultural educational facilities and programs.

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